



## CAPABILITIES STATEMENT

### ABOUT

Knexus Research Corp. (KRC) is a small business and a pioneer in (AI), machine learning (ML), and data privacy research and development. We demonstrate the art-of-the-possible and deliver next generation decision automation solutions and privacy protecting technologies to our federal and commercial customers.

KRC's scalable AI & ML software solutions deliver measurable performance improvements, business value, and sustained competitive advantages. Our highly qualified and experienced staff includes over a dozen individuals with PhDs and master's in computers, data science, and applied mathematics with broad and deep software engineering expertise.

#### **SMALL BUSINESS**

**started:** 2006

**years in business:** 16

**corporation:** S-Corp. (Virginia)

**employees:** 25

**CAGE:** 4WYG2

**DUNS:** 615336950

**Clearance:** Secret

#### **FOUNDER & PRESIDENT**

Dr. Kalyan Moy Gupta

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kalyan.gupta@knexusresearch.com

### WHY KNEXUS?

We are the most dependable, best value AI, ML, applications and data privacy solutions provider. We have a uniquely qualified and experience staff who use institutionalized best practices for research, software engineering, and management. Our unmatched productivity, quality and on-time delivery has resulted in proven successes and awards spanning more than a decade.

### OUR INNOVATIONS PROVIDE UNFAIR ADVANTAGES TO OUR

Navy Task Group Commanders develop and evaluate courses of action in minutes instead of days with our patent pending AI and ML algorithms for automate planning, plan learning, and situation assessment.

US Census Bureau shares economic data safely with the public using our synthetic data generators and differential privacy algorithms that guarantee individual data privacy protection.

Critical care units save lives with our ML algorithms that improve mortality prediction accuracy by processing clinical notes together with lab results.

The nation's military and diplomatic leadership outthink, out maneuver, and dominate adversaries using our culturally aware, emotionally reactive, and deception capable AI agents.

First responders save lives by using our privatized cell phone call data analytics software that gives advanced warning about emergent crises such as active shooter events.

## OUR SERVICES

We offer research, development, test, and evaluation (RDT&E) services over the entire life cycle of **AI, ML, and privacy** solutions.

## CODES & CERTIFICATIONS

- SBA 8(a) Certified
- DCAA Certified
- Facilities Clearance Secret
- Cybersecurity Maturity Model Cert (in Progress)
- NAICS: 541715 (R&D in Physical Science & Engineering)
- 541511, 12, & 13 (Comp Programming & Software Design)

OUR R&D EXPERTISE

### AI, ML, & PRIVACY RESEARCH

We apply rigorous research methods to develop algorithms and technologies that measurably outperform the state-of-the-art in AI, ML, and data privacy. We deliver innovative algorithms, publish scientific papers in top-tier journals and conferences, and produce intellectual property & software patents. These innovations are the foundation of our transformative software tools and products.

#### AI & AUTONOMY

- Reasoning & Explanation
- Language & Image Understanding
- Goal Directed, Trustworthy Agents

#### MACHINE LEARNING

- Conventional & Deep
- Active, Interactive, & Incremental
- Classification & Prediction
- Planning Model Learning
- Knowledge Discovery

#### DATA PRIVACY

- Synthetic Data Generation
- Differentially Private Data Analytics

### DECISION SUPPORT & AUTOMATION SOFTWARE DEVELOPMENT

We use state-of-the-art software development and engineering best practices to deliver high performance, next generation AI tools, systems, products, and privatized data analytic solutions. We integrate and transition our tools and systems into your operating environment.

#### CONCEPT DEVELOPMENT

- Use Cases & Storyboards
- Prototypes
- Concept Demonstrators

#### AI, ML, & PRIVACY TOOLS

- AI ML Libraries & Toolkits
- Data Cleansers, Annotators
- Crowd Sourcing Tools
- Synthetic Data Generators & Evaluators
- Visualizers & Dashboards

#### AGILE & SECURE DEV OPS

- Digital Data Environments
- Gov Cloud, AWS, Maven, Kubernetes
- Containerized Micro Services
- Web and Mobile Apps

#### SYSTEMS & PRODUCTS

- Multi-echelon Operations Planner
- Autonomous Wingman
- Maritime Threat Analyzer
- Clinical Outcome Predictor
- Survey Data Synthesizer
- Administrative Information Management System

OUR TOOLS & PRODUCTS

### Test & Evaluation

We use experimental design to conduct and deliver objective and fair comparative performance evaluation of systems and their capabilities.

#### EXPERIMENTAL DESIGN

- Metrics Design
- Design Of Experiments
- Test Protocols
- Acceptance Criteria

#### AUTOMATED TESTING

- Test Case Generators
- Integrated Testbeds
- Simulated Evaluation

#### ANALYSIS & REPORTING

- Data Quality Audits
- Verbal Protocol Analysis
- Technical Reports & Publications

#### INTERACTIVE TESTING

- Human Subject Experiments
- System Walkthroughs

OUR T&E EXPERTISE

# OUR THOUGHT LEADERS



**DR. KALYAN GUPTA**

**PRESIDENT & FOUNDER**

PhD Management Science  
AI & ML Theory & Practice  
Natural Language Understanding  
Image Understanding  
Process & Task Automation

**DR. MICHAEL FLOYD**

**LEAD AI ML SCIENTIST**

PhD Computer Science  
Goal Reasoning,  
Autonomy & Trust  
Deep Learning  
Explainable AI

**DR. CHRISTINE TASK**

**LEAD PRIVACY SCIENTIST**

PhD Computer Science  
Differential Privacy,  
Privatized Data Analytics  
Privacy Evaluation

**BRYAN AUSLANDER**

**AI ML PM & ARCHITECT**

Masters Computer Science  
Automated Mission Planning,  
ML for Text Analytics  
AI Systems T&E

# OUR ACCOMPLISHMENTS

## PUBLICATIONS & PATENTS

- 6 Patents
- 118 Peer Reviewed Publications in Top Tier AI, ML Journals, Conferences, & Workshops

## AWARDS & CERTIFICATES

- 3 Best Papers Awards
- Overall Winner of 2009 AAAI AI Video Competition
- CIO Applications Top 25 Machine Learning Companies-2018
- Department of The Navy

## DEMONSTRATORS & APPLICATIONS

- Prediction and Recognition of Intent Deception and Emotion (PRIDE)-DARPA
- Adaptive Mine Countermeasures Operational Planning & Replanning (AMORE)- NAVY
- Socio Cultural Indicators of Language (SCIL) Program Demonstrator for US Congress-IARPA
- Administrative Information Management System (AIMS)- US Naval Research Lab
- Privacy Enhanced Social Network Analysis (PRESNA)-DARPA
- Census Bureau Data Synthesizer (CenSyn)- CENSUS BUREAU

# WHAT OUR CUSTOMERS ARE SAYING



For our role as a Technology Integrator and Evaluator in the IARPA Socio-Cultural Indicators in Language (SCIL) Program.

**“Your dedication and insights have contributed to the progress that the program has enjoyed. Thank you for your time, energy, and thoughtful guidance.”**

Dr. Heather McCallum -Bayliss  
Program Manager  
Center for Incisive Analysis



Recognizing the benefits of our task and workflow automation software called Administrative Information Management System (AIMS) that supports over 250 scientists.

**“I was able respond to this action item in a few minutes without having to reach out to the Branches and bother your researchers and engineers. In an era of numerous quick response action items per week, AIMS has more than shown its value.”**

Dr. John McClean  
Division Superintendent (Code 5500)



Recognizing Knexus staff's prompt and effective resolution of software architectural issue in a mission critical system.

**“Micah Heineck (KRC Architect) played a critical role in its resolution last week. Also, we appreciated the work done by the entire KRC staff in their support of the Census Bureau.”**

John A. Fattaleh, PMP  
IT Program Manager  
Center for Economic Development  
Disclosure Avoidance